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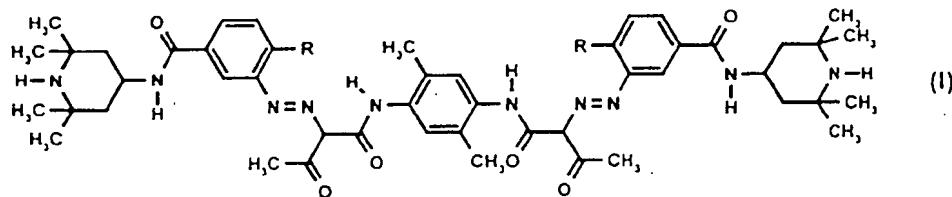
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(54) Pigment for warpage-free polyolefins coloration

(57) Use of a pigment of formula (I)



where both R are Cl or COOCH₃
for the coloration of polyolefins which do not warp.

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Description

[0001] This invention relates to the use of a pigment for the warpage-free coloration of polyolefins.

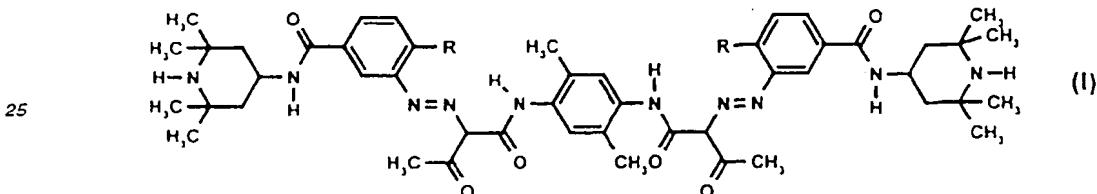
5 [0002] Unexpected shrinkage and warpage problems can occur when organic pigments are used for the coloration of polyolefins, especially high density polyethylene. This may be due to changes in crystallization behavior due to the presence of pigments. A number of studies have shown that pigments can affect both the size of the crystallites and the rate of crystallization by acting as nucleating agents, inducing crystallization at higher temperatures than expected.

10 [0003] All these aspects have an important commercial issue. For example the coloration of bottle crates is a very important market for a pigment producer. A pigment has to fulfill an important condition when used in high density polyethylene application: it must not influence the crystallization process of the polymer. Such an influence can cause shrinkage or warpage, showing deformations of the injected article and deterioration of the mechanical properties.

15 [0004] In order to avoid this problem, when using organic pigment for the coloration of polyolefins, surface treatments have been developed in order to modify the surface of the pigment : precipitation on the surface of the organic particules of a thin layer of a metal oxide (e.g. zirconium, silicium or aluminium) or adsorption or precipitation of some polar polymers (polyacrylates or cellulose derivatives) on the pigment surface. However these treatments are not always efficient.

20 [0005] It has now been found that light stabilizing azo-pigments of formula (I) do not provoke warpage when used in high density polyethylene.

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where both R are Cl or COOCH₃.

[0006] The invention, therefore, resides in the use of a pigment of formula (I) for the coloration of polyolefins which do not warp and provides warpage-free polyolefins, more preferably high density polyethylene (HDPE), which have been colored with a pigment of formula (I).

35 [0007] When coloring polyolefins with a pigment of formula (I) the usual amounts can be used, i.e. from 0.01 to 30% by weight, preferably from 0.1 to 10% by weight based on the material to be colored.

EXPERIMENTAL PART

40 [0008] The testing method is the following:

- injection mould 10 test plates 60 x 60 mm in HDPE with and without 0.1 % pigment
- processing temperature 220 °C and 280°C
- result: difference of the length and width measurement between test plates in natural HDPE and in HDPE colored with 0.1% pigment.

$$\% FV = (\% \text{ vertical shrinkage} - \% \text{ horizontal shrinkage}) / (\% \text{ horizontal shrinkage}) \times 100\%$$

% FV = 0 - 10% : good

% FV = 10-20% : suitable

50 % FV > 20 % : unsuitable

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	% FV at 220°C	% FV at 280°C
R = Cl	12.29	12.74
R = COOCH ₃	8.21	1.81

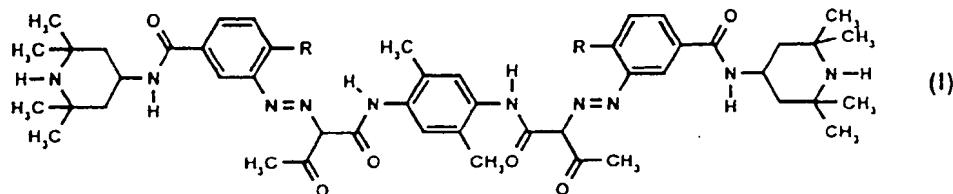
[0009] With the pigment of formula (I) an excellent result is obtained regarding warpage of the test plates.

Claims

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1. Use of a pigment of formula (I)

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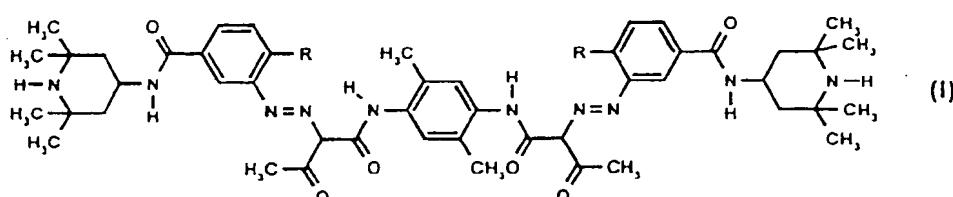
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where both R are Cl or COOCH₃

for the coloration of polyolefins which do not warp.

2. Warpage-free polyolefins which have been colored with a pigment of formula (I)

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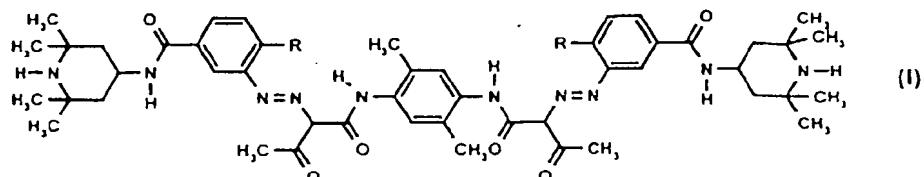
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where both R are Cl or COOCH₃

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3. High density polyethylene (HDPE) which does not warp and has been colored with a pigment of formula (I)

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where both R are Cl or COOCH₃

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EUROPEAN SEARCH REPORT

Application Number

EP 00 81 0772

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
Y	US 4 838 943 A (BITTERLI PETER ET AL) 13 June 1989 (1989-06-13) * claim 19; examples 6,A-C *	1-3	C08K5/00 C08K5/23 C08L23/00 C08K5/3435
Y	US 5 472 495 A (SCHROEDER JOERG) 5 December 1995 (1995-12-05) * column 2, line 38-47; claims; examples *	1-3	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			C08K
<p>The present search report has been drawn up for all claims</p>			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	6 November 2000	Friederich, P	
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-11-2000

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 4838943 A	13-06-1989	DE	3612148 A	10-12-1987
		DE	3618216 A	03-12-1987
		DE	3630717 A	17-03-1988
		DE	3632039 A	31-03-1988
		DE	3638763 A	26-05-1988
		AT	89587 T	15-06-1993
		DE	3785881 A	24-06-1993
		EP	0241419 A	14-10-1987
		ES	2054699 T	16-08-1994
		HK	73096 A	03-05-1996
		JP	2637731 B	06-08-1997
		JP	63006058 A	12-01-1988
		US	4866113 A	12-09-1989
US 5472495 A	05-12-1995	DE	4313090 A	27-10-1994
		EP	0621306 A	26-10-1994
		JP	6306204 A	01-11-1994